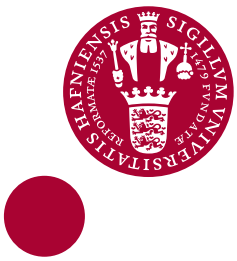

Being a woman in a man's place or being a man in a women's place

insights into students' experiences at science and engineering at university

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19 Being a woman in a man's place or being a man in a woman's place: Insights into students' experiences of science and engineering at university

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Abstract This chapter presents a study carried out in three Danish higher education study programmes within science, technology, engineering or mathematics (STEM), each with a heavy imbalance in student s' biological sex. In Denmark few female students apply for computer science and physics with nanotechnology while few male students apply for molecular biomedicine. The study explores how students of the minority biological sex attain recognition within the study programme and how they negotiate their identities to gain a sense of belonging. The results show how both male and female students, being the minority in their study programme, need to engage in narrow gendered identity negotiation-processes to belong and become socially and academically integrated into their new study programme. We show how female students need to position themselves as non-feminine and strive to become 'one of the boys' whereas male students are restricted to positioning a certain kind of masculinity to become recognized. There is more room for doing gender within computer science for the female students than within physics & nanotechnology. The male students within molecular biomedicine are expected to position themselves as something different from the girls. Their negotiation strategy to get integrated into their study programme could be labelled as 'segregation'. The implications of these results are discussed.

Keywords: Gender, Minority, Majority, Identity, Physics, Molecular biomedicine, Computer Science,

Introduction

In recent years the literature within science education has been inspired by feminist theories led by Judith Butler (1993) to address gender as something students *perform* through culture (Archer et al., 2010; Sinnes & Løken, 2012, see also

chapter 4, 6 and 17 in this book). As a consequence, research challenges the assumptions that men and boys, and women and girls, belong to homogeneous gender groups, who are masculine and feminine in one particular way that is shared by either men or women (Gilbert & Calvert, 2003; Henwood, 1998; Phillips, 2007). Rather it is suggested that research should approach gender as a complex category in which students position themselves (Davies & Harré, 1990) – and that the way students position themselves changes in accordance to the cultural context and social relations they participate in. From this perspective science and engineering is not gender-neutral: 'Scientific knowledge, like other forms of knowledge, is gendered. Science cannot produce culture-free, gender-neutral knowledge.' (Brickhouse, 2001 p. 283).

As a consequence research in students' participation in science and engineering should focus on the relationship between the culture the students engage in, the students' ways of performing gender and how various attempts at positioning are recognized or not. Davies and Harré (1990) introduce the notion of positioning to approach the way ongoing identities are constructed and renegotiated as we engage ourselves in new social relations, draw on different discourses and participate in different cultural contexts. Hasse (2002, 2008) suggests that this process has to be studied as a learning process. She carried out an anthropological study in which she enrolled as a physics student together with other first year students. She explored how the students learn *to become* physics students and how they perform gender in terms of gaining recognition as 'proper' physics students within the culture of the study programme.

In the context of engineering, Tonso (2006) conducted an ethnographic study highlighting how engineering students through engineering culture and practice are required to develop '*into scientific and engineering selves'* (p. 304) in certain (gendered) ways to present themselves *as engineers* in a way that is recognised by the campus community. As with Hasse, the point of departure of Tonso is students' meeting with a certain culture (in this case engineering) combined with a particular interest in the performance of gendered identities.

> As contextualized in activity, identity production at PES [Public Engineering School] was a process through which persons' sense of themselves as engineers led to performances of engineer selves that were viewed through lenses of cultural forms for campus engineer identity, and where recognition *as* an engineer conferred belonging (Tonso, 2006, p. 303).

Further the focus of Tonso was on how gender is produced in certain ways when a minority (of female students) meet a majority (of male students):

> Women were, and to a great degree still are, considered people who are welcome only to the extent they accept the way things have historically been done' (Tonso, 1999, p. 279).

In particular, STEM and engineering study programmes face a heavy imbalance in students' biological sex[1]. This imbalance appears to influence ways of getting recognized within the study programmes. Gonsalves (2010) shows how women in doctoral physics programmes position femininity as something outside of physics, different from ordinary women with stereotypical femininity. Instead they position themselves as 'tomboys' belonging to physics. Also Due (2012) points at two competing discourses in physics which sets the scene for students' available positions; one highlights physics as a masculine discipline, and another physics as a gender neutral discipline. A similar conclusion is reached in a study comparing the discourses available within physics and biology programmes for students in their production of scientist subjectivities. It is found that a narrow range of gendered student science subjectivities are available in physical science. On the contrary student-led activities as found in biology, provides opportunities for new science identities that transcend masculine/feminine dualisms (Hughes, 2001). However students from female-dominated and gender-mixed disciplines perceive men and women as being intrinsically different; more so than do students from male-dominated disciplines. This, in different ways, sets the scene for gendered ways of being recognized as a proper student. This focus on gender similarities or differences has been shown to depend on the particular culture:

> If the question focuses on values, male dominated disciplines tend to highlight gender similarities. Conversely, if the question is about concrete gender equality work the rationale is based more on gender differences, differences that are often self-evident and taken for granted in everyday situations (Haake, 2011 p. 124).

But striving at study programmes with an equal balance of students' biological sex is not the solution: 'It should make us suspicious of attempts to produce a more 'balanced' science simply by increasing the number of women in it' (Gilbert & Calvert, 2003, p. 875). More women in science does not necessarily change the way the knowledge-structure is gendered. To change students' access to science whatever way they perform gender we must therefore study how science culture includes certain ways of doing gender while excluding others.

The above review calls for research on students in study programmes with a heavy gender imbalance, to focus on how participation in STEM is being perceived as gendered by the students, how students position themselves within those gendered positions, and which positions they experience as being recognized and

[1] We distinguish between "sex" and "gender". "Sex" refers to the distinction between male and female based on biological attributes while "gender" refers to the way male and female students interpret the social and culturally embedded frames and expectations of being male or female (see Chapter 4). Most of this chapter deals with gender (the students handling the expectations), but we sometimes refer to the biological distinction (e.g., the distribution of male and female students) and then use the term "sex". To emphasise the difference, we add "biological" sex.

which they have to renegotiate to eventually feel they belong. This process of encountering a STEM study-programme with a heavy gender imbalance is therefore related to students' negotiations of their identities and the learning-process the students undergo when meeting their first year and strive at getting socially and academically integrated (Tinto, 1993). This is the focus of the research reported in this chapter.

Aim and research questions

We explore how students who enter a STEM study programme within higher education negotiate their identity in their meeting with a STEM higher education study programme with a heavy imbalance of students' biological sex. We explore study programmes with both a majority of female and male students. As a point of departure, in three specific study programmes we wish to explore: how do various cultural settings affect students' construction of their identities. More particularly:

- How do students in general describe their study programme, and what do they perceive as being central for being recognised within it?
- How do the majority students perceive the minority students, and what do they highlight as being important for the minority to become recognised or not recognised within the study programme?
- How do the minority students perceive their position within the study programme and how do they relate to it?

Collecting and analyzing data

Three higher education study-programs have been selected based on information on numbers of female and male students. These are computer science and molecular biomedicine, both at the University of Copenhagen, and physics & nanotechnology at the Danish Technical University. Within computer science, 4-9% female students have been enrolled in the period 2009-2011 (the number has declined throughout the period). Within molecular biomedicine the proportions are 13-24% males from 2009-2011, (the number has increased throughout the period) and within physics & nanotechnology there have been 4-25% female students in the period of 2008-2010 (the number has increased throughout the period (www.studier.ku.dk and www.dst.dk).

To address the above research questions we have applied a multi-method triangulation design where different types of information are obtained about the same theme with different methods in order to obtain an in-depth understanding (Denzin

& Lincoln, 2000). In the triangulation we used writing exercises, workshops and qualitative interviews.

Written exercises were used to get access to the students' considerations of their choice of education and their individual experiences within the first few years of their university education' (40 written descriptions were obtained). In the workshops the students were working in groups. Firstly, they were asked individually to make a list of themes they considered important for a student to get through their first year at university. Secondly, within groups of peers they were asked to prioritize the themes. This exercise was used to provide insights into the possible gendered negotiations among students about the themes (we held 8 workshops with 41 participating students). Qualitative individual and group interviews were held; firstly to unfold the students' narratives of entering the selected educational programs and their experiences during the first year, secondly to gain insight into how the students negotiate their gendered power position. 12 qualitative interviews were performed involving 31 students, consisting of 5 individual and 7 group interviews. All student names in this chapter are pseudonyms as to provide the students with anonymity.

The analysis presented in the Results section is divided in two parts. The first part offers an analysis of all students' description of their study programme. From these descriptions we extract a general discourse about the study programme, although we do not include all the variations in the descriptions. As a consequence not all of the participating students would recognise their own perceptions in reading the extract. In the second part of the analysis we show how the minority is seen by the majority of students and further how minority students perceive the cultural setting and position them in relation to it.

Results

Students' experiences of their programme

The descriptions presented below result from our analysis of the students' experiences within their first year of studies. The focus is on the students' negotiations of their identity in relation to the subject they encounter. The purpose is to show the discourses the students draw on when describing their study programme. The second part of the analysis shows how the students position themselves in relation to the discourses presented below.

Physics & nanotechnology

The students describe the study programme physics & nanotechnology as requiring the students to be in love with physics. Although all students are interested

in science and some in nanotechnology, it is the physics that defines the students belonging to the educational program. As one student puts it: *'it is like other subjects [i.e. other than physics] don't quite reach the depth of the world's content'*[2]. Another strong signifier among the students is a common experience that now they are (finally) challenged intellectually. The students explain how the study programme is characterised by high standards; something which is much appreciated and that they have missed in their previous educational experiences. The students describe how they compete in reaching the high standards of the study programme, which they strive to match. The students also identify social integration as important and something that is worth investing in, often in combination with the heavy workload of the study programme.

Computer Science

The students' descriptions of their attachment to computer science are rather vague and they describe a diverse array of ways to become a computer science student: two of the common attachments can be broadly defined as liking computers and wanting to do programming. The students describe a strong student community as central for their access to learning to think like a computer scientist. They define themselves in relation to this community either as being a member or by recognizing its existence. Older students play an important role in the integration and inclusion of new students into the community during the first years of study. Inclusion is social but also to a high degree academic, as one student expresses it: *'One of the important things, both in order to complete and to 'keep it' is to have a good social network'*. The students describe the computer science community as distancing itself from the official university, due to an experience of lack of structure, technical problems and messiness.

Molecular biomedicine

The students describe becoming a molecular biomedicine academic not on its own but in relation to other professions. First of all, being a molecular biomedicine academic is described as not being interested in having patients like a medical doctor although fascinated by medicine. Secondly, it is described as not being interested in animals and plants although being interested in biology. The students define being a molecular biomedicine academic as something it is not – as a residual. Dealing with becoming a molecular biomedicine academic is hard. One student says: *'many of them [fellow students] are really ambitious; it affects me and pressures me'*. Intellectually the students describe a culture where high grades are demanded and the label 'elite' is put forward as a requirement the students need to meet to belong. Also, socially the students describe a study programme with many activities which they perceive being important to participate in to gain belonging. The majority of girls are put forward as the explaining factor of the ambiguous,

[2] Please note that the interviews were made in Danish. We have chosen verbatim translations rather than linguistically correct ones.

uniform, high pressure, and non-relaxed possibilities. In this way social relations act as a way to cope with the pressure.

These different descriptions of the three study programmes clearly give different frameworks for all the students to negotiate within in their process of constructing an identity. Within physics & nanotechnology you need to be fascinated by physics, and a very high level of performance is expected. However, the students indicate this as a relief; finally they are been challenged. The study has a strong common identity and is competitive. Within computer science, the students only have a vague attachment to the content, there exists a very strong academic and social study environment including both new and older students, and the study programme is characterised by many sub-cultures making the horizontal cohesiveness among first-year students vague. Within molecular biomedicine, the deselection of medicine and biology unites the students. There exists a high level of performance that stresses the students in various ways, and both male and female students ascribe gender significance to their negotiation of identity.

The result of the workshops shows that across all the three educational programmes it is the social inclusion that is central for the students. Almost all of the groups prioritise social integration in various forms as the most important topic for surviving the first year in their study programme. This appears to be in opposition to the students' descriptions of the three studies as very different, as described in the following. One interpretation is that the social dimension overrides the different gendered cultures the students are negotiating within. Another interpretation is that the students ascribe different meanings to what being social means in different cultural settings.

In the following we wish to combine the students' descriptions of their study programme, with quotes from the students of the majority biological sex about their perceptions of the study programme and how to navigate to become a proper student at the study programme, and also quotes from the students with the minority biological sex illustrating how they perceive themselves belonging to the study programme. By bringing together these perceptions of being a student, and in particular a student possessing a minority biological sex, we aim to analyze what is recognized within each programme and how students negotiate their identity and gender to fit in.

How to become a physics & nanotechnology student when being the female minority

Within physics & nanotechnology, a group of male students describe what it must be like to be a girl on the study programme:

> Allan: 'I think they easily become one of the boys – they need to adjust when there is such a huge [gender imbalance] it's going to be a male culture' [no matter what].
>
> Christian: 'If you don't fit in, then you stand too much out, then you are not part of the club and then it is not possible to be here.'

As the male students in this quote indicate, the girls need to be *one of the boys* to fit in. They need to fully assimilate into the *male culture*. This is echoed across the data from physics & nanotechnology:

> Allan: 'A physicist as a woman – those two things do just not fit well!'
>
> Christian: 'No, that does not fit with the picture'

To belong within physics & nanotechnology, the minority (girls) need to ascribe to a particular non-feminine culture in their negotiation of identity in order to get recognized as a full-blooded physicist. To some of the girls this requires a negotiation of who they perceive themselves as being. The students ascribe being a student of physics & nanotechnology as a place for high level and pace, and this culture requires the girls to perform their gender in particular ways to be recognised as physicists. As one group of male students explained, if one of the male students faces difficulties in keeping the pace, he can still get recognised by fellow students if he involves himself in the social part of the study programme. In contrast, if a female student does not keep the pace, it seems incompatible with being *one of the boys*, her only way to stay within the study programme is, as explained by the group of male students, to be good looking. Good looking, though, is not being related to 'being one of the boys' – therefore being in love with physics requires of girls not to be too girlish and to keep the pace. An example of keeping this balance of being one of the boys is described by Louise:

> Sometimes the male students say things they do not mean seriously, For example me and my fellow student walked together at campus, and saw one of the older female students, and he says *'Karen is just the only pretty girl here at physics'* after a while of silence I reply: *'Thanks William'*, and he was like: *'God no, no, no, I am not…'*

It is clear from the quote that the female student is perceived as 'one of the boys' by the male student. But as there exists an opposition between being girlish and being a physicist – the female students cannot be recognized within both categories at the same time. In this case, Louise has succeeded in becoming like the majority, in this case a masculine one, so much that she is no longer perceived as female. But this balancing how to position one's gender in a way that is recognised as belonging to physics, without being in danger of getting feminized and thereby excluded from being recognized as a proper physicist, can be a difficult balance to keep for some of the female students:

> Brian: 'Consider how much she [one of the female students] is getting bullied with she is going to take a shower [at the retreat[3]]. Rasmus could take as long a shower as he would, but Laila was instantly bullied with expressions as: you have 10 minutes' [indicating that women take long showers]

It seems that the girls within physics & nanotechnology are running the risk of being feminized within the study programme, and this is not only affecting their social integration within the study programme but also their academic integration.

> Olga: 'We watched Myths Busters [a science programme on the Discovery TV channel] in one of the lectures and then our teacher had found some mistakes in the programme which we should identity. And then, I don't know, it became very boyish like 'girls cannot do this'…and then we thought 'yes we can, we are actually some right here'
>
> Interviewer: 'How do you experience it when such things happen?'
>
> Olga: 'I think it is the other girls, not me I do not take it on me, as it is me. I know that if you take 100 girls they cannot – I do not find it to be something personal'.

The example shows how the female students do not internalize and recognize themselves within the offered position, but rather exclude it as something that concerns other girls.

The desire to 'be one of the boys' has some consequences for the female students. Louise explains how she does not have any relationship with the other girls on the study programme, but belongs to a group of male students – a group that was formed by the institution in the beginning of first year with the purpose of introducing the students to the university. At the beginning of the year an older student was attached to the group as a tutor, but after the formal meetings ended the group have kept on meeting. She further explains some situations where she feels herself being positioned as feminine; when she is participating in social activities she is getting a lot of attention, which she finds to be an advantage for 'boosting her self confidence', but sometimes in her study group she find it hard to 'be one of the boys' when the talk centers around 'toilet-habits' or 'computer games', two topics often debated in the group. Another student, Sarah explains how you need to accept the jargon to be part of the study programme:

> Sarah: 'At some point you are just so much one of the guys. I joke with it myself' [that she is one of the guys]
>
> Interviewer: 'But do you experience that it is necessary for you to have this jargon or to be one of the boys in order to be here – do you understand what I mean?'
>
> Sarah: 'Yes, yes, yes I have really not thought about it, so not 100% but in some point

[3] At many Danish Universities older students arrange a retreat, typically a weekend or a whole week, where the new students are taken to a summerhouse. The intention is social and to introduce the students to the study life through the experiences of older students.

> yes, I think you really need maybe not to use the jargon yourself but you need to be able to accept it.'
>
> Interviewer: 'Do you also use the jargon yourself?'
> Sarah: 'More than I did before'
>
> Interviewer: 'Is it a jargon that you only use at [the particular place for the study programme]?'
>
> Sarah: I use it when I am together with the guys out here…it is not something I go and think so much of.'

Sarah ascribes herself to the dominant culture at the study programme by both accepting its existence and premises and herself using a particular language used by the male students. She has adjusted her behaviour in a way that is legitimate as a physics & nanotechnology student and she has internalized it in a way that she finds makes it legitimate to be female too. In that respect she is fully integrated as a physicist, however through an adaptation of practices within the community.

These examples show how gender is negotiated in order to become like the majority gender, in this case a masculine one. These findings are echoed in the literature. Danielsson (2009) finds that female physicists balance the norms for being a women and being a physicist by positioning themselves as different from other women. Another study among engineering students shows how female engineering students needed to perform their gender in particular ways to gain recognition and hence to apply certain coping strategies such as acting like one of the boys, accepting gender discrimination and adopting an 'anti-woman' approach (Powell, Bagilhole, & Dainty, 2009):

> In 'doing' engineering, women often 'undo' their gender. Such gender performance does nothing to challenge the gendered culture of engineering, and in many ways contributes to maintaining an environment that is hostile to women. (Powell et al., 2009, p. 411)

In a study of students in the social sciences Søndergaard (1996) shows how academic prestige is linked to masculinity. Her study explored the construction of gender in academia in relation to different aspects, including the academic practice, but also how the students expressed themselves through their clothing and in their sexual encounters. These different practices are all gendered and linked to interpretations of the individual students' practices. Hence, not only is academic competence and prestige linked to masculinity, but some subfields of the discipline are considered masculine (and hard) while others are linked with femininity. In other practices, there are expectations concerning how males and females should act, for instance, who should be the active partner in a sexual encounter.

Søndergaard uses the concept of a matrix to explain how this web of gendered expectations and interpretations works. Importantly the gendered practices do not prevent female students from entering a subfield with masculine connotations, or to make the first approach on the dance floor. What they do, however, is that male and female students are met with particular expectations and interpretations based

on what Søndergaaard coins as 'the sign on the body', that is, the biological sex that is visible to the outside world. A female student entering the discipline will therefore be tacitly expected to be less competent than the male students, just as she will be expected to have a preference for the subfields that are connoted as feminine. Female students entering fields that are considered masculine are, so to speak, behind on points, because their biological sex is interpreted as a sign of less competence.

The idea of the matrix is that the individual students' practices in different contexts affect each other. If, for instance, a female student wishes to enhance her status as competent she could downplay or neutralise her clothing, hairstyle, use of make-up, etc., in order to appear less female and through this evade the interpretation as less competent. This practice, neutralising her appearance and entering a masculine subfield, will make her appear less feminine in other contexts as well, for instance, in the emotional and sexual encounter. Conversely, if the female student maintains a distinct feminine appearance in order to be recognised as feminine in social contexts she runs the risk of being interpreted as less competent. Students therefore need to balance how they 'score' at the different matrices in order to be recognised in different social contexts, but the opportunities for male and female students will be different from the outset.

As stated in the first part of the analysis the culture within physics & nanotechnology also affects the male students, who need to position themselves as clever and in love with physics. Having a male sign on the body, in other words, still requires a practice that is considered legitimate and recognisable within the disciplinary culture.

How to become a computer science student when being the female minority

Within computer science the findings are more complex than the homogeneous picture within physics & nanotechnology. As stated earlier, the students in general describe a diverse array of ways to attach to the study programme, and hence there seem to be more diverse perceptions of being the female minority:

Kenneth: 'I do not think about it'

Lars:'It's no problem'

Søren:'Whether it is a boy or a girl doesn't matter'

Ryan:'The girls have the same terms as the rest of us'
…..
Kenneth:'The girls that have been best adapted are the ones that are most masculine'
…..

> Søren:'The girl [in our group] did put more into the layout of the assignment'
>
> Ryan:'I have a longhaired boy in my group: he does things like that'

These quotes from male computer science students show the various ways that they ascribe meaning to being a girl on the programme. The girls need to be one of the boys, the girls are not different from us and some boys are like the girls. Based on our interviews and the other material we have collected within the computer science programme our interpretation is that this is the result of sub-cultures within the study programme being gendered in different ways. It is however, beyond the scope of this chapter to unfold this complexity in greater detail.

A central question seems to be how this affects the female students' social and academic integration strategies. In the narrative of Emily, she tells how the social integration requires a certain vocabulary:

> The way you speak to each other; the content, the terminology, and the way of competing is very excluding. Girls get frightened about it – and it's hard to get into it (…) But very identity-building (…) It is cool to be the one who knows slang if you are a part of the club, then it's nice, you get recognized

Emily explains how the very technical jargon has been a part of her vocabulary due to her older brothers. Furthermore she explains that she is different from other girls since she has a high IQ which she feels helps her get recognized, because she does not struggle much with the academic content:

> I think [the jargon] is unpleasant for other girls, and they feel more stupid than they necessarily are. That's part of the game, to make people who do not know it [the jargon] feel stupid

Emily explains how people without high self-confidence will find it *'a torment to be here'*, and she explains how in particularly the female students are vulnerable to this because they have a tendency to underestimate their own abilities. Concerning the academic integration she explains how the male and female students have different learning strategies, and that the male way of learning is enhanced by the teaching on the study programme:

> Boys try again and again and again to find a solution. They search for information, read books – try to fix it in some way or the other. Most girls meeting a problem think, I do not know what to do, I will ask a teacher or a fellow-student (…) The learning process is more social for most girls.

But by asking questions without having tried everything out on her own, there is a danger of a girl being positioned as un-intelligent, and the girl may feel that it enhances the picture of 'girls cannot do computer science'. To counteract that she might try harder on her own before asking. And a large part of the culture at computer science, as Emily describes it, has to do with being intelligent: *if you are smart you are recognized no matter how you behave.* According to her you need to learn to learn in a new way, and this way is implicitly enhanced by the teaching:

> Emily: 'Large parts of the content that was included in the exam paper…was content that you haven't heard more about before. [During the course the teacher said]: there exist this

> programme, play with it, take it home with you…you will figure it out. At the exam almost none of the girls knew how to solve the problem related to that programme.'

This 'take it home and play with it' presupposes that the students by themselves find not only the solution but also learn different ways of getting to it, and according to Emily this is experienced as *anxiety-provoking* by most girls. From the example it seems that the study of computer science presupposes gendered experiences and practices that do not necessary reflect competences but different ways of approaching a problem.

In Sofie's narrative her perception of the social culture is different from that of Emily. Sofie explains how you always can find help if you ask other students, and they will be happy to help you. '*Forget your pride, and ask for help´*, she explains – failing is quite normal, and you need to ask for help to get through. Only very few students pass the exams within the estimated study period, she explains. One interpretation of the two girls' differing descriptions is that there are distinct subcultures, gendered in different ways. Emily with her self-reported high IQ might be a part of the competition of being a smart student, while Sofie apparently is more focused in how to get through. This seems to have an influence on how they position themselves and perform their gender, and whether or not they find themselves exposed when asking for help.

Emily's descriptions of the learning culture within the computer science programme is supported within the literature. Hasse (2002) describes how girls in physics are confused because they did NOT (like they were used to from school) get credit for "following the instructions". Rather what was recognized was being playful and trying out own ideas. Our data point towards similar findings, although the gendered learning cultures within computer science programmes require further study.

How to become a molecular biomedicine student when being the male minority

Very few boys enter molecular biomedicine. Contrary to the two other study programmes, this student minority is expected to construct their own community together, as stated by these female molecular biomedicine students:

> Karen: 'You need to be a loud boy and good at the social – not isolate oneself – that does not work'

> Susan: 'It must be difficult because there are not so many they can hang with' [implicit that you need to be able to hang with someone from our own sex]

> Pernille: 'They [the boys] are good at doing something with the boys at other levels – they stick very well together'

Fanny: ‘You have a need for talking to someone with the same biological sex’

The boys are recognized as belonging to molecular biomedicine but perceived as different from the girls and gendered in a way that makes it difficult for the girls to hang out with them. This affects the male students’ social integration.

The male students also express their need to create a space of their own masculine setting together with other male students on the study programme. As a consequence they form a collective group, or gang, of all male students regardless of the number of years studied at molecular biomedicine. This gang is organized by the students themselves. Two male students describe the gang in this way:

Peter: ‘We have a gang away from [the study programme], such a male thing, where the politically correct stuff like saying that you don’t need to drink, just vanishes’

Will: ‘But there we also know that everybody thinks it is fun’

Interviewer: ‘Could you tell a little more about this gang?’

Will: ‘We went to this gang inauguration with extreme drinking, different games - really masculine, like being in a sauna and drinking booze and then going out and running around naked

Peter: ‘It is also a kind of natural isn’t it - when we are boys we need to find some way to stick together’

For these boys the negotiating of gender concerns their ability to deal with being with a feminine majority and a way to deal with this is to create a space of their own masculine setting together with other male students on the study programme. From this perspective it seems that molecular biomedicine is gender-segregated, that makes it is hard for the boys to become one of the girls and furthermore, that it is perceived as being unattractive to boys. Being together with fellow students sharing the same gender is described as a relief:

Peter: ‘You kind of sometimes miss boys, it can be very girly I think…cause you are together with girls all the time - you can miss being together with boys occasionally’

Will: ‘We have experienced that when you finally get out and it is only boys from the study programme, then it almost like a, you get really relaxed and talk about things which you have been left alone with’

Peter: ‘Totally relief, yes that is real enough’

Will: ‘Then we almost talk ourselves as girls because there is so much to talk about’

[Both students laugh]

‘To talk like girls’ is an expression that is mentioned several times, and which also seems to set the scene for the male students positioning themselves within molecular biomedicine. They are required to perform a certain kind of masculinity

to feel recognized as biomedicine students. In the above quotes the female students articulate this as the male students are required to be loud and good at socializing, and this way of getting recognized seems to be a challenge to some of the male students:

> Peter: 'Actually, I tried it yesterday: wow, how girls are good a small-talking. When I come into this room – I just freeze, but for the girls it only takes 30 seconds, then they have a conversation going on'.
>
> Will: 'Yes, in the beginning of the study you could sit and really feel outside'.

At the same time as being loud and social expectations seem to be a perception of the male students, the male students negotiate how to become recognized as a molecular biomedicine student without it being on the premises of the majority gender. An example is one of the boys telling how the boys position themselves as something else than what they describe as '*the calendar girls'*: this is used as an expression by the male students to denote female students reaching for their calendars as soon as some information is given. It covers how the female students are well organized, have a high self discipline and work ethic. This behavior is perceived by the male students as a symbol of a very organized and controlled life which they do not want to adapt themselves to, and they describe it as a competence possessed by the girls. Instead the male students negotiate what is described as a very ambitious study culture with a high performance pressure. '*We do not show in class that we are wise although we are'* [like the women tend to do according to the interviewed men] and '*we do not need to have everything under control'*. The male students thereby position themselves in opposition to being a *calendar girl* which affects their interaction with the study programme.

The male students within molecular biomedicine are perceived as something different from the female majority by both the female and male students themselves. They cannot hang out with the girls all the time and are expected to prefer each other's company. They are required to perform a certain kind of masculinity, being loud and having a good social life, which sets the frame for their positions and way of belonging to the study programme. Also in an academic context the male students positions themselves as different from the well organized *calendar girls* who they perceive to be controlled. They do not find it necessary to present and position themselves as in control and clever to get recognized, as they describe the girls do. Compared to the girls within physics & nanotechnology, in one perspective the males within molecular biomedicine have room to be a molecular biomedicine student in different ways than the majority within the study programme. In another way they are expected to be different from the female majority– where the minority of female students in physics & nanotechnology are expected to become one of the boys. These differences are discussed below.

Discussion

The task of negotiating one's identity is a project for all students entering a higher education programme (Holmegaard, Madsen, & Ulriksen, 2013; Ulriksen, Holmegaard, & Madsen, 2013). In the present analysis we show how both male and female students, being a minority in their study programme, also need to engage in a gendered identity negotiation-process in struggling to belong and become socially and academically integrated into their new study programme.

The results show how students apply different gendered strategies for being recognized within the three study programmes; computer science, molecular biomedicine and physics & nanotechnology. They range from striving to become like the majority to explicitly maintaining one's differences. Whereas the female students have different strategies for 'being as' within computer science and physics & nanotechnology, the male students in various ways struggle to 'fit in' within molecular biomedicine.

The female students in their narratives of being the minority gender within both physics & nanotechnology and computer science relate themselves to being more *masculine* than other girls, in telling an individual history of how they previously have belonged to a man's world. For example they have only male friends, they have only played with boys in their childhood, or they are used to being in a male dominated environment during earlier educational settings. The possible strategy they see in order to be recognized as respectively a computer scientist or a physicist is to ascribe masculinity into their identity in various degrees. They are required to modify their gender within the negotiation process of entering a new study programme and getting recognized as a proper student within it by assimilating. However, it also seems from the analysis that there is slightly more room for doing gender within computer science for the female students than within physics & nanotechnology. We ascribe this to our notion of different subcultures within computer science that appears to give the female students a range of possibilities for gaining recognition.

Considering molecular biomedicine, where the male students are the minority, we found a different pattern. The male students we interviewed expressed themselves not with a 'being as' but with a 'fitting in'. They denote themselves as different from the majority gender and not by trying to behave as one of them. None of the male students had a history of being in a girls' world or defined themselves as a girl-boy. From the analysis it seems that the male students were able to negotiate an identity without discarding their masculinity and still be legitimate members of the culture. Yet they are still required to perform a certain kind of masculinity and position themselves as something different from the girls. Thus, their negotiation strategy to become integrated into their study programme could be labelled 'segregation'.

Another aspect of the strongly dominant gendered culture is that for the majority of students certain ways of doing gender is perceived to be legitimate, leaving out other ways. It is relevant to assume that certain male students' positions within computer science and physics & nanotechnology are required to gain recognition and hence that other attempts are being marginalised. However, it is beyond the scope of this chapter to unfold this perspective.

Overall, our analysis shows that the different higher education programmes provide different but well defined and narrow frameworks for what ways of doing gender are legitimate and recognizable, and that the students' negotiations deal with which forms of doing gender the students experience as acceptable. From the analysis it seems that female students are urged to position themselves as non-feminine whereas male students are restricted to positioning a certain kind of masculinity to become recognized. The female students aim at positioning themselves as aligned with the male majority, and in doing so they cannot be too girlish. Rather they struggle to become one of the boys. For instance, none of the interviewed female students talked about a feminine sisterhood in any way. If this positioning fails our results suggest that only the female students are in danger of being excluded as not clever enough. Following Søndergaard (1996) this is related to the way gender and competence are related in the matrix. When academic competence is related to masculinity, female students need to understate their gender in order to be recognised as competent but at the same time they need to balance this performance with other practices if they still wish to be recognised as female. On the other hand, male students are expected to perform masculinity together, which is approved and encouraged by the majority of girls to be legitimate members of the culture. However, in an academic context where masculinity initially is convergent with competence male students seem to have a broader range of positioning possibilities in order to become recognised.

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